Innovation-Led Economy Aspiration by Year 2020: Are Malaysian Universities Ready?

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Throughout East Asia, the urgency of nurturing innovation oriented human capital is pressing. In Malaysia, the government policy has been shifted from resources based to innovation-led economy. Malaysia government believe that innovation-led economy will enable Malaysia to achieve high income status by the year 2020. Their believed is that innovation will boost new values creation in term of new product and service thus creates competitive edges in the market competition for Malaysia.

The volume of innovation oriented human capital affects innovation outcome and it should be acknowledged that quantity of university graduates is an important contributing factor. Based on World Development Indicator, gross enrolment rate (GER) in tertiary education in Malaysia is 40 per cent of the population of the age group that officially corresponds to the tertiary education (The World Bank, 2012). Since the GER in Malaysia is below 50 per cent of its total population, it is tough to obtain sufficient number of skilled and innovative human capital in Malaysia, out of the 30 per cent university graduate population in the country. As the technology becomes more skill biased and innovation competitive pressure intensifies, Malaysia needs more innovative human capital. The country desperately needs larger number of university graduate skilled workers. The shortage of science and technological skilled graduates will definitely impact upon the innovation-led aspiration.

The Initiatives

Malaysia government has initiated many initiatives with regards to the innovation-led economy. Special Unit for Innovation or *Unit Inovasi Khas* (UNIK) was established under the Prime Minsiter office to act as the focal point for innovation in Malaysia. UNIK drives innovation strategies and policies, while Malaysia Innovation Agency or Agensi Inovasi Malaysia (AIM) was established to acts as the implementation arm for innovation related initiatives. At national level, UNIK and AIM establishment are to drive the surge forward towards developing innovative human capital.

In order to support National Innovation Strategy formulated by *Agensi Inovasi Malaysia,* the Ministry of Higher Education established Research Universities (RUs), Acceleration Programme for Excellence (APEX) programme and Higher Institution Centres of Excellence (HiCoEs) in universities. These three main initiatives are to provide markers that show the development of university and specific science standard among the universities in Malaysia.

The HICOEs were established with the aim to drive institutions of higher education to stay competitive in the various fields of research, expertise and services both at the national and international level. The diversity of established HiCoE is an on-going effort to acculturate and improve the quality of research and development (R&D) as well as other services offered by higher education institutions. To date Malaysia has six HICOEs at the universities through the injection of funds; recognised CoEs will be nurtured, guided and monitored to enable them to boost their achievement in their specific fields at highly competitive regional and international levels. Table 1 is the listing of HiCoE in Malaysia universities.

Besides, Ministry of Higher Education Malaysia had introduced Acceleration Programme for Excellence (APEX) initiatives to accelerate the quality of universities in Malaysia by focusing on the potential winners. APEX program is to develop World Class University. The APEX status has been introduced and a substantial amount of research grants has been given to Universiti Sains Malaysia since 2009 to date. The APEX initiatives aim to boost the research, development and commercialisation of scientific research outputs and turn them into Intellectual Property (IP). Through the transition from teaching oriented to research oriented university, the APEX university are also benefited from the full autonomy of the university administration.

Other than APEX initiatives, Research University (RU) status has benefited five premier universities in Malaysia namely Universiti Malaya, Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, Universiti Sains Malaysia and Universiti Teknologi Malaysia. Both RU and APEX initiatives are hope to help the universities to foster innovation and technological evolution in Malaysia. The RUs will take up basic research to generate new ideas and initiated the process of transforming their ideas into innovation with potential commercial relevance.

In term of knowledge transfer and soft skills enhancements, the Ministry of Higher Education Malaysia had introduced Higher Education Entrepreneurship Development Policy for all Malaysia Public Higher Education on 13 April 2010. This will support the economic development through supplying the pipeline of innovators and entrepreneurs that will be the frontier of the Malaysia New Economic Model. In responses to the policy, all universities in Malaysia had introduced entrepreneurship subject as one of the university compulsory co-curriculum for undergraduates.

TABLE 1 HiCoEs in Malaysian Universities

No.	HiCoE	University	Focus
1.	UM Centre of Research for Power Electronics, Drives, Automation & Control (UMPEDAC)	Universiti Malaya (UM)	Renewable Energy
2.	UKM Medical Molecular Biology Institute (UMBI)	Universiti Kebangsaan Malaysia (UKM)	Cancer Biomarkers
3.	Institute for Research in Molecular Medicine (INFORMM)	Universiti Sains Malaysia (USM)	Diagnostics Platforms
4.	Institute of Bioscience (IBS)	Universiti Putra Malaysia (UPM)	Animal Vaccines and Therapeutic
5.	Centre for Drug Research (CDR)	Universiti Sains Malaysia (USM)	Behavioural Research in Addiction
6.	Accounting Research Institute (ARI)	Universiti Teknologi MARA (UiTM)	Islamic Finance Criminology

Discussion

Despite the various initiatives, Malaysia competitiveness showed a different picture. In recent Global Competitiveness Report (GCR), Malaysia's ranking at 21st place out of 142 countries (World Economic Forum, 2012). Higher Education and Training, the fifth pillar of competitiveness ranked 38th (in GCR 2011-2012), 49th (in GCR 2010-2011) and 41st (in GCR 2009-2010) (World Economic Forum, 2012). These 38th, 49th and 41st rankings means Malaysia higher education and training since 2009 to 2012 does not improve much (World Economic Forum, 2012). For Malaysia to improve its total competitiveness further, Malaysia needs to improve its higher education and training system (World Economic Forum, 2012). Higher education stakeholders must take up this challenge and the university system need to be improvised in response to the Innovation-led Economy Aspiration because innovation-led economy aspiration is built on competitive human capital that has gone through excellent higher education system.

One of the problems in Malaysian higher education is coping with the explosive enrolment growth. Despite the growth, the intake of science undergraduates is relatively low (The World Bank, 2012). Low supply of science graduates from the university for the Innovation-led Economy will delay the process of technological and scientific innovation. The university has no power to solve this problem. Policies formulation is proposed to be used to improve this condition, the reformation through policies must be consistent, integrated and complete (The World Bank, 2012). Obviously, Malaysia higher education system has an uneven distribution of students across disciplines (The World Bank, 2012). Lack of diversification has implications for the responsiveness of their education system to new labour market demand which is innovation-led economy (Asian Development Bank, 2012). Malaysia is then relying on the comparatively very small group of graduates in science to drive the technology advancement innovation. The issue is seemingly straight forward; Malaysia is lack of science graduates supply from the university.

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Based on estimates Malaysia Gross National Products will be comprised of science based activities over the next two decades, this fact represents a compelling opportunity for scientists and science graduates. However many researches explained the Government Research Institutes (GRIs) and university scientists are not commercialising their research and technologies due to lack of commercialisation value in their scientific research. Very few GRIs and university have demonstrates valuable research products that are of value to the customers. Problem such as the inability of their laboratory research scale conversion into industrial scale products, entrepreneurial acumen such as sensitivity to business demand, business profits or of social value creation are argued to be lacking. Even though the creative human aspect is present, without entrepreneurial knowledge and skills, this growing percentage of the scientifically skilled scientist will not be capable to contribute to Malaysia economic competitiveness through innovation.

The cost of building the state-of-art laboratories, equipment and human capital in Malaysia through educational spending is comparatively among the highest in Asian (The World Bank, 2012). The facilities to conduct research and innovation in Malaysia public higher education are established but they are been utilised and used by postgraduates and academics. The

university should bring the industry personnel and engage them to the undergraduates to an eye-opening talk in term of career prospects available for them and reveals the skills that the industry demanded. Exposure of the industry innovation and university research activities are lacking among the science undergraduates, especially the pure and fundamental science courses.

Another hindrance of innovation-led economy for Malaysia is the untapped innovation and creativity potentials among the female science graduates. In the southern Malaysia entrepreneurship, women entrepreneurs have become important players (Alam, Mohd Jani and Omar, 2011). But the field of science is perceived as masculine, hard, complex, demanding and difficult, therefore the involvement of women in science and technology related entrepreneurship in Malaysia is lower than the male counterpart (Ministry of Human Resources, 2011). Based on statistics, female enrolment in science undergraduates at the Malaysia public university outnumbered the male (Ministry of Higher Education, 2012). Many researchers in Malaysia argue these contradicting phenomena might be one of the reasons of lesser creativity value and innovation from the science graduate group. The creativity of these women graduate are not channelled into scientific and technological innovation due to many women graduated in science ended up working for non-science, service and administrative economic sector.

The analysis of innovation capacity and capability gaps in Malaysia higher education indicated clear shortcomings of higher education in delivering sufficient amount of skills graduates in contributing to technological capability and innovation in Malaysia economy (The World Bank, 2012). In a report, innovation orientation among higher education graduates in low and middle income East Asia is not being managed as a system but instead as individually disconnected institutions (The World Bank, 2012). In response, Ministry of Higher Education Malaysia has formulated a plan, the innovative human capital (IHC) in 2012. The IHC model indicated a new curriculum should be implemented at the university (Ministry of Higher Education, 2012). Four key elements in the IHC model are to produce mind that is creative, innovative, collaborative and entrepreneurial at the university level (Ministry of Higher Education, 2012). However, the report from National Economic Advisory Council (2010) concludes that creativity and innovation has yet to reach a comfortable level in Malaysia. According to the report, "... Efforts to innovate and create have been insufficient. The weak track record of domestic innovation in Malaysia is reflected by the comparatively low number of researchers" (National Economic Advisory Council, 2010).

Concluding Thoughts

The absence of successful innovators among the Malaysian research institutes and universities makes the university graduate suffers from lack of role model to be inspired. Besides, they are lack of industry exposure. Therefore, the graduate in Malaysia university have vague idea on the innovation career path and has no role model to be imitated.

Innovation, creativity and entrepreneurship culture in university should be inculcated to prepare the graduates towards innovation-led economy. The combination of innovation, creativity and entrepreneurship knowledge transfer at university should be improved. Some stated that the entrepreneurial education in Malaysia universities failed to inculcate soft skills such as creativity. Therefore, for some cases, problem based learning technique should be taken up more frequent compared to student centred or lecturer centred learning style to nurture creativity and innovativeness among undergraduates.

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